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Case Report

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Association of amyloidosis and lung cancer; a case of small cell lung cancer masked by amyloidosis with 18-FDG uptake

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ABSTRACT

Amyloidosis is a rare and fatal disease that occurs with the accumulation of amyloid protein in the organs. The most common presentations are nephrotic syndrome, cardiomyopathy, and unexplained hepatomegaly. We present a case of small cell lung cancer as a result of mediastinoscopic biopsy in a patient who presented with a lung mass and 18-FDG uptake on PET/CT, and amyloidosis was found in the bronchoscopic biopsy result.

Keywords: Lung cancer, 18-FDG uptake, amyloidosis

INTRODUCTION

Amyloidosis is a rare and fatal disease that occurs with the accumulation of amyloid protein in the organs. The most common presentations are nephrotic syndrome, cardiomyopathy, and unexplained hepatomegaly. Pulmonary involvement can be localized or systemic, primary or secondary, hereditary or acquired.[1] The incidence of pulmonary amyloidosis is uncertain because many cases are diagnosed incidentally during open lung biopsy or autopsy.

Lung cancer is the most common and deadliest type of cancer in the world.[2] Small cell lung cancer constitutes 10-15% of lung cancers. Generally, the disease has metastasized to other organs in most of the patients at the time of diagnosis.[3] Amyloidosis due to lung cancer is rare among the causes of secondary amyloidosis.

18-FDG PET/CT is accepted as an important diagnostic tool that is widely used in the detection of potentially malignant lesions.[4]

We present a case of small cell lung cancer as a result of mediastinoscopic biopsy in a patient who presented with a lung mass and 18-FDG uptake on PET/CT, and amyloidosis was found in the bronchoscopic biopsy result.

CASE

A 71-year-old male patient had complaints of chest pain, cough, weight loss, night sweats and shortness of breath, and was undergoing dialysis 4 times a week due to chronic kidney failure on the basis of amyloidosis. In his physical examination, a decrease in breath sounds was detected in the lower region of the left lung on auscultation. A cardiology consultation was requested due to the patient's chest pain development. No signs of cardiac amyloidosis were found in the ECG and echocardiography of the patient. The patient's laboratory values were WBC:16,500 (mm^3) (4.5-11,500), CRP (mg/L): 73 (0-5), Urea (mg/dl): 97 (18-55) serum creatinine (mg/dl): 4.4 (0.72-1.25). In the thorax CT of the patient, a 9*7 cm mass in the upper lobe of the left lung, pulmonary artery invasion, mediastinal lymphadenopathies, and a pleural effusion reaching 3 cm thickness in the left hemithorax were detected (**Figure 1**). With these findings, primarily malignant diseases were considered. PET-CT was taken to reveal the extent of the disease. The PET-CT report resulted as follows. An increased FDG uptake was noted in the 87x108 mm mass lesion in the paramediastinal area (SUVmax 5.1) in the hilar region of the left lung, and the 35x41 mm nodal lesion (SUVmax 4.1) in the subcarinal region. Increased FDG uptake in the bone tissue, bilateral mandible, right hyoid bone, sternum, clavicles, costae, columna vertebralis, humerus, pelvic bones, and femurs, which erodes the bone tissue in diffuse foci and in places in the form of soft tissue infiltrations (SUVmax 7.3) has been noted. These findings included primary focus, metastasis, multiple myeloma, and amyloidosis among the preliminary diagnoses (**Figures 2-4**).

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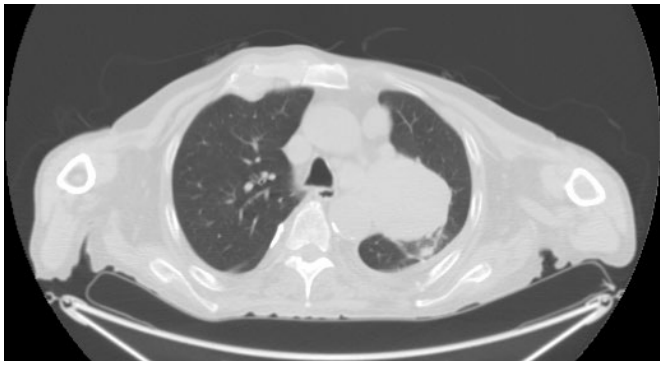

Figure 1. Thorax CT cross-section

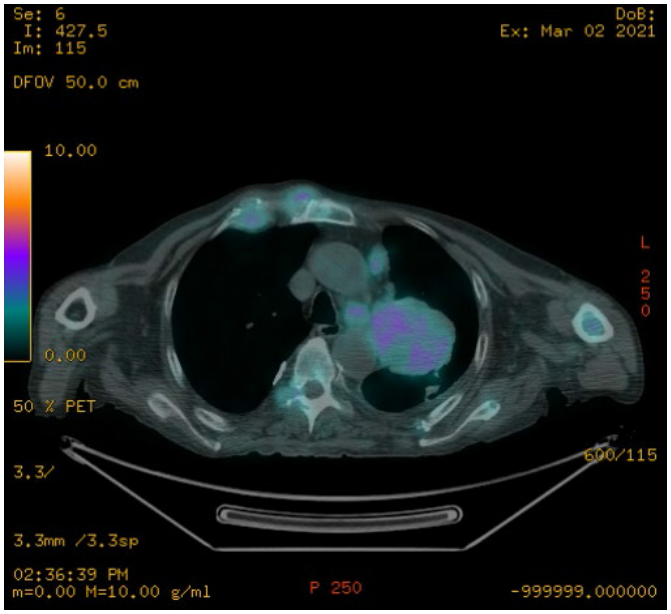

Figure 2. PET/CT cross-section

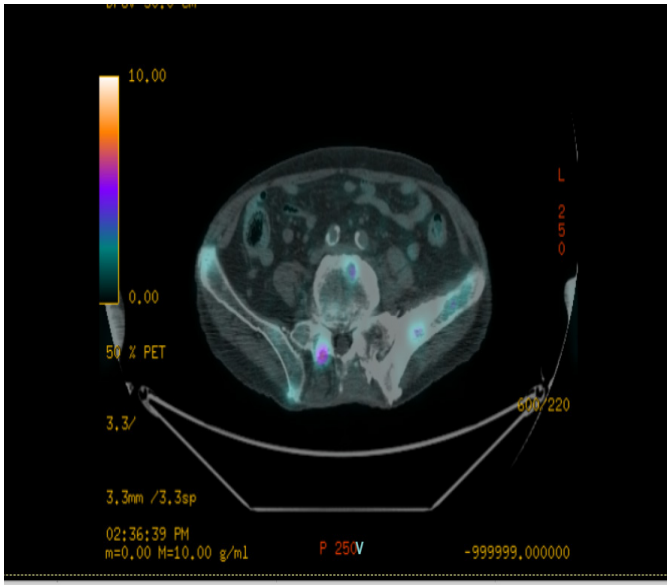

Figure 3. PET/CT cross-section

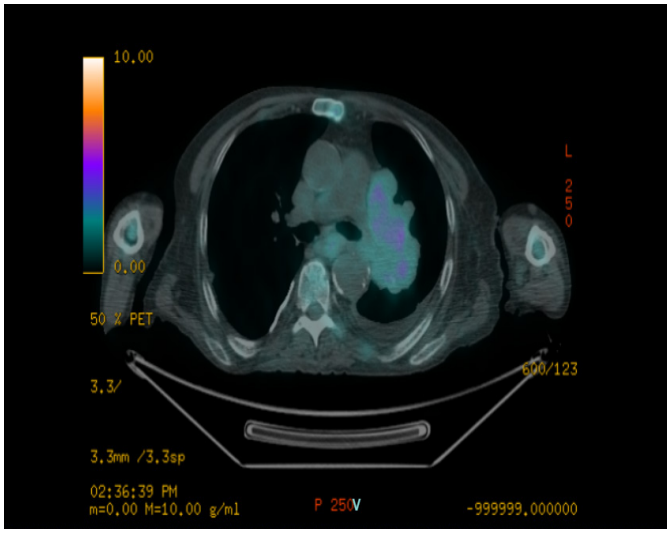

Figure 4. PET/CT cross-section

The patient underwent a brain MRI for brain metastases. In the patient's brain MRI, there was a 10 mm-sized T1 isointense, T2 slightly hyperintense lesion showing diffusion restriction was observed in the right temporal cerebral cortical area. Also, irregularly circumscribed solid masses measuring 4.5x4 cm on the right and 5x4.5 cm on the left were observed in the bilateral mandible. These lesions were found to be compatible with metastasis and amyloid involvement.

We performed a bronchoscopy on the patient as the primary diagnostic procedure. On bronchoscopy, a mass was seen at the entrance of the left upper lobe and upper division of the lung. From here, biopsies and lavage were taken. Microbiological tests were studied in bronchoscopic lavage. No pathogen was detected. According to the pathology report, there is evidence of lymphoplasmacytic inflammatory cell infiltration and vascular proliferation in the stroma, along with alveolar macrophages and bronchial epithelial cells containing pigment-loaded large cytoplasm. The report states that there are no indications of atypia or malignancy, and the results are in keeping with the presence of amyloidosis and chronic nonspecific inflammatory findings.

In the case whose pathology result was amyloidosis, since the clinical and radiological suspicion of cancer continued, lymph node excision was performed from mediastinal lymphadenopathies in an external center. The pathology result was small cell lung cancer.

The patient received chemoradiotherapy treatment but passed away three months after diagnosis.

DISCUSSION

The incidence of pulmonary amyloidosis is uncertain because many cases are diagnosed incidentally during open lung biopsy or autopsy.

Little is known about the relationship between amyloidosis and the neoplastic state. Intratumoral amyloid deposition may contribute to the pathogenesis of the neoplastic condition.[5] Carcinoma-associated antigens can induce aggregation of amyloidogenic immunoglobulin light chain and nodular lesions.[6] The incidence of systemic AA amyloidosis in cancer patients is 0.1% to 0.4%.[7] In the series of 4033 lung cancer cases, only 1 amyloidosis case was detected).[8] In view of the small number of reported cases, the correlation between the pathological type of lung cancer and amyloidosis is unknown. High serum concentrations of SAA have been found in associated with the dissemination of lung cancer.[5] Only two cases have been reported of patients with pulmonary squamous cell carcinoma who developed systemic AA amyloid deposition after receiving treatment with chemoradiation and an immune checkpoint inhibitor.[1] Our case was diagnosed with systemic AA amyloidosis and small cell lung cancer developed during follow-up. Small cell lung cancer is the third most common lung cancer, and most

patients metastasize to other organs at the time of diagnosis .[3] In our case, there were several metastases present.

Positron emission tomography (PET) is used for differentiating benign and malignant lesions, as well as staging and monitoring response to chemotherapy. However, PET may show increased involvement in infectious and inflammatory diseases like sarcoidosis, tuberculosis, fungal infection, and cerebral abscess, leading to false positive results in oncological PET/CT studies.[9] Inflammatory diseases can cause false positive PET/CT results. FDG uptake occurs in areas with inflammation due to increased glucose uptake by macrophages and inflammatory cells. The threshold value for SUVmax is 2.5 for evaluating 18-FDG uptake. A higher standardized maximum uptake value increases the possibility of malignancy in lung and mediastinal lesions.[10,11] High SUVmax uptake in our case of amylodosis caused the suspicion of malignancy to continue.

A few case reports mention patients with nodular pulmonary amyloidosis who underwent 18F-FDG PET/CT, most of whom showed increased FDG uptake. In a study evaluating the role of 18F-FDG PET/CT in a group of patients with both systemic and localized amyloidosis, 18F-FDG uptake was observed in all patients with localized amyloidosis, but not in all patients with systemic amyloidosis. It has been shown that PET/CT can be useful in disease management and decision-making before biopsy is performed in patients with pre-diagnosed amyloidosis with pulmonary nodules.[12]

CONCLUSION

Pulmonary nodules; it is seen in a variety of lung diseases, including tumor, tuberculosis, and infection, but amyloidosis is rarely considered a candidate for the differential diagnosis of such lesions. Coexistence of lung cancer and amyloidosis is rare and should be kept in mind in the differential diagnosis.

ETHICAL DECLARATIONS

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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